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Title: Techniques for measuring and modeling river complexity at a watershed scale.

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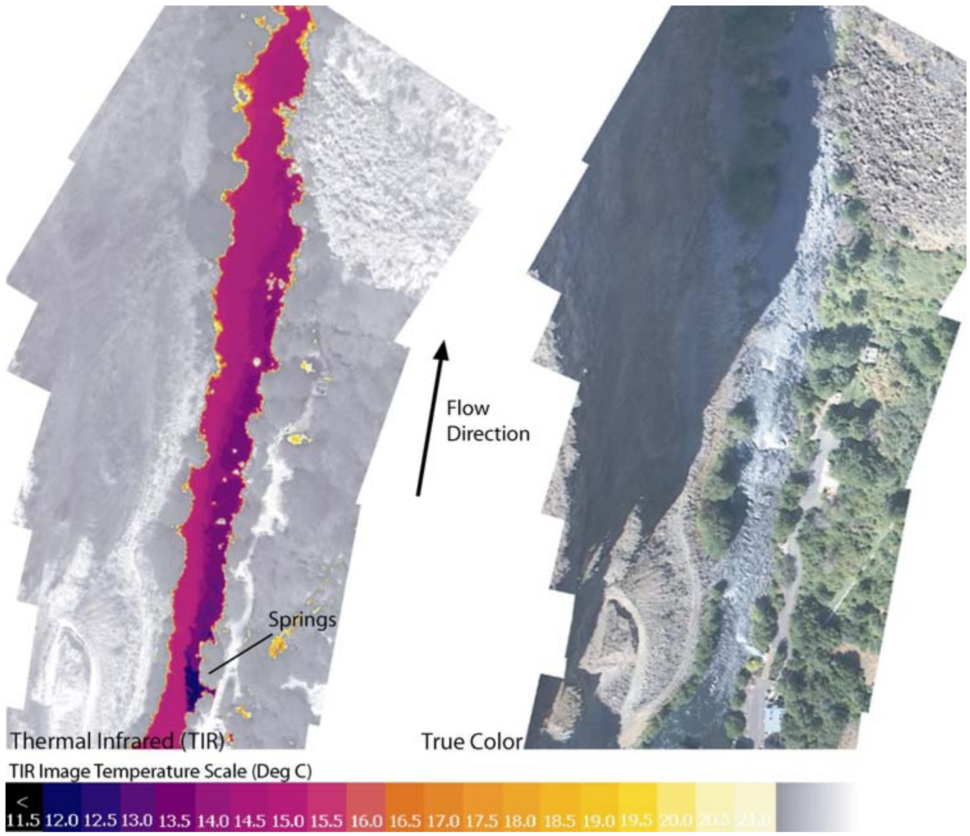
Abstract:

River systems are naturally variable across multiple spatial scales (landscape ->reach->unit-> sub-unit). Traditionally, this variability has been simplified by ground level monitoring and incomplete analytical methodologies used to quantify watershed processes and water quality dynamics. The developments in airborne remote sensing technologies such as thermal infrared, hyperspectral, and LiDAR (light detection and ranging) provides accurate spatially continuous high resolution data across multiple spatial scales. Data collected throughout the Pacific Northwest demonstrate that streams and rivers are complex and highly variable, in both form (features) and function (processes). In fact, simple observation of remotely sensed data indicates that the conceptual framework for riverine and alluvial processes should be expanded to include process complexity (e.g., multiple interrelated processes, some of which are previously considered unimportant). This new found awareness of watershed process complexity and interrelatedness has facilitated advances in analytical technique. Methods that fully and concurrently characterize fundamental water quality, hydrologic and habitat processes can be expanded to utilize remote sensing data at high resolutions (i.e., 1:5,000 or less). A relatively new development includes methodologies that preserve analytical resolutions, with output intervals and distances appropriately scaled for cumulative effects analysis. This presentation provides an overview of these remote sensing technologies and their application in watershed assessment. In addition, it provides an example of how these data are utilized to accurately simulate water quality, hydrologic and habitat response.

A Graphic: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